

What is claimed is:

1. A method of manufacturing an interconnect substrate comprising:
forming a first conductive layer;
5 forming an insulating layer so that at least a part of the insulating layer is disposed on the first conductive layer; and
forming a second conductive layer so that at least a part of the second conductive layer is disposed on the insulating layer over the first conductive layer,
wherein each of the first and second conductive layers is formed by discharging
10 drops of a solvent containing fine particles of a conductive material, and
wherein the insulating layer is formed by discharging drops of a solvent containing fine particles of an insulating material.
2. The method of manufacturing an interconnect substrate as defined in claim 1,
15 wherein the second conductive layer is formed so that a part of the second conductive layer is electrically connected with a part of the first conductive layer.
3. The method of manufacturing an interconnect substrate as defined in claim 1,
wherein the insulating layer is formed on the first conductive layer and in a
20 region adjacent to the first conductive layer.
4. The method of manufacturing an interconnect substrate as defined in claim 3,
wherein the insulating layer is formed of a plurality of layers,
wherein a lower layer of the insulating layer is formed in a region adjacent to a
25 region in which the first conductive layer is formed, and
wherein an upper layer of the insulating layer is formed on the first conductive layer and the lower layer of the insulating layer.

5. The method of manufacturing an interconnect substrate as defined in claim 4,
wherein the lower layer of the insulating layer is formed after forming the first
conductive layer.

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6. The method of manufacturing an interconnect substrate as defined in claim 4,
wherein the first conductive layer is formed after forming the lower layer of the
insulating layer.

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7. The method of manufacturing an interconnect substrate as defined in claim 1,
further comprising:

forming one or more posts on the first conductive layer by discharging drops of
a solvent containing fine particles of a conductive material,

wherein the insulating layer is formed to avoid a region in which the posts are
formed.

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8. The method of manufacturing an interconnect substrate as defined in claim 7,
wherein the insulating layer is formed so that a height of an upper surface of the
insulating layer is substantially equal to a height of an upper surface of at least one of
the posts.

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9. The method of manufacturing an interconnect substrate as defined in claim 7,
wherein the second conductive layer is formed to pass over at least one of the
posts.

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10. The method of manufacturing an interconnect substrate as defined in claim
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wherein the second conductive layer is formed to avoid at least one of the posts.

11. The method of manufacturing an interconnect substrate as defined in claim 10, further comprising:

5 forming a second insulating layer so that at least a part of the second insulating layer is disposed on the second conductive layer; and

 forming a third conductive layer so that at least a part of the third conductive layer is disposed on the second insulating layer over the second conductive layer,

 wherein the third conductive layer is formed by discharging drops of a solvent
10 containing fine particles of a conductive material, and

 wherein the second insulating layer is formed by discharging drops of a solvent containing fine particles of an insulating material.

12. The method of manufacturing an interconnect substrate as defined in claim
15 11,

 wherein the second insulating layer is formed to avoid a region in which at least one of the posts is formed, and

 wherein the third conductive layer is formed to pass over at least one of the posts.

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13. The method of manufacturing an interconnect substrate as defined in claim
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 wherein at least one of the posts is formed by a plurality of steps.

14. The method of manufacturing an interconnect substrate as defined in claim
25 11, further comprising:

 forming one or more electronic components,

wherein each of a plurality of components forming one of the electronic components is formed by discharging drops of a solvent containing fine particles of a material.

5 15. The method of manufacturing an interconnect substrate as defined in claim 14,

 wherein each of the electronic components is one of a capacitor, a resistor, a diode, and a transistor.

10 16. The method of manufacturing an interconnect substrate as defined in claim 14,

 wherein at least one of the electronic components is formed on a surface on which the first conductive layer is formed.

15 17. The method of manufacturing an interconnect substrate as defined in claim 14,

 wherein at least one of the electronic components is formed on the insulating layer.

20 18. The method of manufacturing an interconnect substrate as defined in claim 14,

 wherein at least one of the electronic components is formed on the second insulating layer.

25 19. The method of manufacturing an interconnect substrate as defined in claim 1, wherein the first conductive layer is formed on a substrate.

19, 20. The method of manufacturing an interconnect substrate as defined in claim 19,
wherein the substrate includes a depression section; and
wherein the first conductive layer is formed to pass through the depression
5 section.

19, 21. The method of manufacturing an interconnect substrate as defined in claim 19,
wherein at least a top surface of the substrate is formed of an insulating material.
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19, 22. The method of manufacturing an interconnect substrate as defined in claim 19,
wherein the substrate includes an insulating section and a conductive section
which is formed through the insulating section, and
15 wherein the first conductive layer is formed over the insulating section and the
conductive section so that the first conductive layer is electrically connected with the
conductive section.

20 23. The method of manufacturing an interconnect substrate as defined in claim 19, further comprising removing the substrate from the first conductive layer.

24. A method of manufacturing a semiconductor device comprising:
manufacturing an interconnect substrate; and
mounting a semiconductor chip on the interconnect substrate,
25 the manufacturing of an interconnect substrate including:
forming a first conductive layer;
forming an insulating layer so that at least a part of the insulating layer is

disposed on the first conductive layer; and

forming a second conductive layer so that at least a part of the second conductive layer is disposed on the insulating layer over the first conductive layer,

wherein each of the first and second conductive layers is formed by discharging
5 drops of a solvent containing fine particles of a conductive material, and

wherein the insulating layer is formed by discharging drops of a solvent containing fine particles of an insulating material.

25. The method of manufacturing a semiconductor device as defined in claim
10 24,

wherein the interconnect substrate is manufactured with a part of the first conductive layer being exposed, and

wherein the exposed part of the first conductive layer is electrically connected with the semiconductor chip.

15 26. The method of manufacturing a semiconductor device as defined in claim
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wherein a conductive layer other than the first and second conductive layers is electrically connected with the semiconductor chip.

20 27. The method of manufacturing a semiconductor device as defined in claim
24,

wherein the first conductive layer is formed over a substrate.

25 28. The method of manufacturing a semiconductor device as defined in claim
27,

wherein the substrate includes a depression section,

wherein the first conductive layer is formed to pass through the depression section, and

wherein the semiconductor chip is mounted in the depression section.

5 29. The method of manufacturing a semiconductor device as defined in claim 27,

wherein the substrate includes an insulating section and a conductive section which is formed through the insulating section, and

10 wherein the first conductive layer is formed over the insulating section and the conductive section so that the first conductive layer is electrically connected with the conductive section.

15 30. The method of manufacturing a semiconductor device as defined in claim 27, further comprising removing the substrate from the first conductive layer.

31. A method of manufacturing a semiconductor device comprising:

mounting a semiconductor chip over a substrate with a surface of the semiconductor chip on which an electrode is formed facing upward;

20 forming a first conductive layer over the substrate and the semiconductor chip so that the first conductive layer is electrically connected with the electrode of the semiconductor chip;

forming an insulating layer so that at least a part of the insulating layer is disposed on the first conductive layer, and

25 forming a second conductive layer so that at least a part of the second conductive layer is disposed on the insulating layer over the first conductive layer,

wherein each of the first and second conductive layers is formed by discharging drops of a solvent containing fine particles of a conductive material, and

wherein the insulating layer is formed by discharging drops of a solvent containing fine particles of an insulating material.

32. The method of manufacturing a semiconductor device as defined in claim
5 31,

wherein the substrate includes a depression section, and

wherein the semiconductor chip is mounted in the depression section.

33. The method of manufacturing a semiconductor device as defined in claim 32,
10 further comprising:

forming a resin layer by filling the depression section in which the semiconductor chip is mounted with a resin,

wherein the first conductive layer is formed to pass over the resin layer.

34. The method of manufacturing a semiconductor device as defined in claim
15 31,

wherein the second conductive layer is formed so that a part of the second conductive layer is electrically connected with a part of the first conductive layer.

35. The method of manufacturing a semiconductor device as defined in claim
20 31,

wherein the insulating layer is formed on the first conductive layer and in a region adjacent to the first conductive layer.

36. The method of manufacturing a semiconductor device as defined in claim
25 35,

wherein the insulating layer is formed of a plurality of layers,

wherein a lower layer of the insulating layer is formed in a region adjacent to a region in which the first conductive layer is formed, and

wherein an upper layer of the insulating layer is formed on the first conductive layer and the lower layer of the insulating layer.

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37. The method of manufacturing a semiconductor device as defined in claim 36, wherein the lower layer of the insulating layer is formed after forming the first conductive layer.

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38. The method of manufacturing a semiconductor device as defined in claim 36, wherein the first conductive layer is formed after forming the lower layer of the insulating layer.

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39. The method of manufacturing a semiconductor device as defined in claim 31, further comprising:

forming one or more posts on the first conductive layer by discharging drops of a solvent containing fine particles of a conductive material,

wherein the insulating layer is formed to avoid a region in which the posts are formed.

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40. The method of manufacturing a semiconductor device as defined in claim 39,

wherein the insulating layer is formed so that a height of an upper surface of the insulating layer is substantially equal to a height of an upper surface of at least one of the posts.

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41. The method of manufacturing a semiconductor device as defined in claim

39,

wherein the second conductive layer is formed to pass over at least one of the posts.

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42. The method of manufacturing a semiconductor device as defined in claim

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wherein the second conductive layer is formed to avoid at least one of the posts.

43. The method of manufacturing a semiconductor device as defined in claim 42,

10 further comprising:

forming a second insulating layer so that at least a part of the second insulating layer is disposed on the second conductive layer; and

forming a third conductive layer so that at least a part of the third conductive layer is disposed on the second insulating layer over the second conductive layer,

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wherein the third conductive layer is formed by discharging drops of a solvent containing fine particles of a conductive material, and

wherein the second insulating layer is formed by discharging drops of a solvent containing fine particles of an insulating material.

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44. The method of manufacturing a semiconductor device as defined in claim

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wherein the second insulating layer is formed to avoid a region in which at least one of the posts is formed, and

wherein the third conductive layer is formed to pass over at least one of the

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posts.

45. The method of manufacturing a semiconductor device as defined in claim

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wherein at least one of the posts is formed by a plurality of steps.

46. The method of manufacturing a semiconductor device as defined in claim 43,
5 further comprising:

forming one or more electronic components,

wherein each of a plurality of components forming one of the electronic
components is formed by discharging drops of a solvent containing fine particles of a
material.

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47. The method of manufacturing a semiconductor device as defined in claim 46,
wherein each of the electronic components is one of a capacitor, a resistor, a diode, and
a transistor.

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48. The method of manufacturing a semiconductor device as defined in claim 46,
wherein at least one of the electronic components is formed on a surface on which the
first conductive layer is formed.

49. The method of manufacturing a semiconductor device as defined in claim 46,
20 wherein at least one of the electronic components is formed on the insulating layer.

50. The method of manufacturing a semiconductor device as defined in claim 46,
wherein at least one of the electronic components is formed on the second insulating
layer.

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51. A method of manufacturing a semiconductor device comprising:
mounting a semiconductor chip over a first substrate with a surface of the

semiconductor chip on which an electrode is formed facing upward;

attaching a second substrate to the first substrate, the second substrate having a shape which avoids the semiconductor chip;

forming a first conductive layer over the second substrate and the semiconductor chip so that the first conductive layer is electrically connected with the electrode of the semiconductor chip;

forming an insulating layer so that at least a part of the insulating layer is disposed on the first conductive layer; and

forming a second conductive layer so that at least a part of the second conductive layer is disposed on the insulating layer over the first conductive layer,

wherein each of the first and second conductive layers is formed by discharging drops of a solvent containing fine particles of a conductive material, and

wherein the insulating layer is formed by discharging drops of a solvent containing fine particles of an insulating material.

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52. The method of manufacturing a semiconductor device as defined in claim 51, wherein the second substrate has a coefficient of thermal expansion closer to a coefficient of thermal expansion of the semiconductor chip than a coefficient of thermal expansion of the first substrate.

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53. The method of manufacturing a semiconductor device as defined in claim 51, wherein the second conductive layer is formed so that a part of the second conductive layer is electrically connected with a part of the first conductive layer.

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54. The method of manufacturing a semiconductor device as defined in claim 51, wherein the insulating layer is formed on the first conductive layer and in a region adjacent to the first conductive layer.

55. The method of manufacturing a semiconductor device as defined in claim
54,

wherein the insulating layer is formed of a plurality of layers,

5 wherein a lower layer of the insulating layer is formed in a region adjacent to a
region in which the first conductive layer is formed, and

wherein an upper layer of the insulating layer is formed on the first conductive
layer and the lower layer of the insulating layer.

10 56. The method of manufacturing a semiconductor device as defined in claim 55,
wherein the lower layer of the insulating layer is formed after forming the first
conductive layer.

57. The method of manufacturing a semiconductor device as defined in claim 55,
15 wherein the first conductive layer is formed after forming the lower layer of the
insulating layer.

58. The method of manufacturing a semiconductor device as defined in claim 51,
further comprising:

20 forming one or more posts on the first conductive layer by discharging drops of
a solvent containing fine particles of a conductive material,

wherein the insulating layer is formed to avoid a region in which the posts are
formed.

25 59. The method of manufacturing a semiconductor device as defined in claim 58,
wherein the insulating layer is formed so that a height of an upper surface of the
insulating layer is substantially equal to a height of an upper surface of at least one of

the posts.

60. The method of manufacturing a semiconductor device as defined in claim 58,
wherein the second conductive layer is formed to pass over at least one of the posts.

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61. The method of manufacturing a semiconductor device as defined in claim 58,
wherein the second conductive layer is formed to avoid at least one of the posts.

62. The method of manufacturing a semiconductor device as defined in claim 61,
10 further comprising:

forming a second insulating layer so that at least a part of the second insulating
layer is disposed on the second conductive layer; and

forming a third conductive layer so that at least a part of the third conductive
layer is disposed on the second insulating layer over the second conductive layer,

15 wherein the third conductive layer is formed by discharging drops of a solvent
containing fine particles of a conductive material, and

wherein the second insulating layer is formed by discharging drops of a solvent
containing fine particles of an insulating material.

20 63. The method of manufacturing a semiconductor device as defined in claim
62,

wherein the second insulating layer is formed to avoid a region in which at least
one of the posts is formed, and

25 wherein the third conductive layer is formed to pass over at least one of the
posts.

64. The method of manufacturing a semiconductor device as defined in claim 63,

wherein at least one of the posts is formed by a plurality of steps.

65. The method of manufacturing a semiconductor device as defined in claim 62, further comprising:

5 forming one or more electronic components,

wherein each of a plurality of components forming one of the electronic components is formed by discharging drops of a solvent containing fine particles of a material.

10 66. The method of manufacturing a semiconductor device as defined in claim 65, wherein each of the electronic components is one of a capacitor, a resistor, a diode, and a transistor.

15 67. The method of manufacturing a semiconductor device as defined in claim 65, wherein at least one of the electronic components is formed on a surface on which the first conductive layer is formed.

20 68. The method of manufacturing a semiconductor device as defined in claim 65, wherein at least one of the electronic components is formed on the insulating layer.

25 69. The method of manufacturing a semiconductor device as defined in claim 65, wherein at least one of the electronic components is formed on the second insulating layer.

70. A method of manufacturing a semiconductor device comprising:

forming a first conductive layer over a semiconductor wafer on which a plurality of integrated circuits are formed so that the first conductive layer is electrically

connected with electrodes of the semiconductor wafer;

forming an insulating layer so that at least a part of the insulating layer is disposed on the first conductive layer;

forming a second conductive layer so that at least a part of the second
5 conductive layer is disposed on the insulating layer over the first conductive layer; and
cutting the semiconductor wafer;

wherein each of the first and second conductive layers is formed by discharging drops of a solvent containing fine particles of a conductive material, and

wherein the insulating layer is formed by discharging drops of a solvent
10 containing fine particles of an insulating material.

71. The method of manufacturing a semiconductor device as defined in claim
70,

wherein the second conductive layer is formed so that a part of the second
15 conductive layer is electrically connected with a part of the first conductive layer.

72. The method of manufacturing a semiconductor device as defined in claim
70,

wherein the insulating layer is formed on the first conductive layer and in a
20 region adjacent to the first conductive layer.

73. The method of manufacturing a semiconductor device as defined in claim
72,

wherein the insulating layer is formed of a plurality of layers,
25 wherein a lower layer of the insulating layer is formed in a region adjacent to a region in which the first conductive layer is formed, and

wherein an upper layer of the insulating layer is formed on the first conductive

layer and the lower layer of the insulating layer.

74. The method of manufacturing a semiconductor device as defined in claim
73,

5 wherein the lower layer of the insulating layer is formed after forming the first
conductive layer.

75. The method of manufacturing a semiconductor device as defined in claim
73,

10 wherein the first conductive layer is formed after forming the lower layer of the
insulating layer.

76. The method of manufacturing a semiconductor device as defined in claim 70,
further comprising:

15 forming one or more posts on the first conductive layer by discharging drops of
a solvent containing fine particles of a conductive material,

wherein the insulating layer is formed to avoid a region in which the posts are
formed.

20 77. The method of manufacturing a semiconductor device as defined in claim
76,

wherein the insulating layer is formed so that a height of an upper surface of the
insulating layer is substantially equal to a height of an upper surface of at least one of
the posts.

25 78. The method of manufacturing a semiconductor device as defined in claim
76,

wherein the second conductive layer is formed to pass over at least one of the posts.

79. The method of manufacturing a semiconductor device as defined in claim 5 76,

wherein the second conductive layer is formed to avoid at least one of the posts.

80. The method of manufacturing a semiconductor device as defined in claim 79, further comprising:

10 forming a second insulating layer so that at least a part of the second insulating layer is disposed on the second conductive layer; and

forming a third conductive layer so that at least a part of the third conductive layer is disposed on the second insulating layer over the second conductive layer,

15 wherein the third conductive layer is formed by discharging drops of a solvent containing fine particles of a conductive material, and

wherein the second insulating layer is formed by discharging drops of a solvent containing fine particles of an insulating material.

81. The method of manufacturing a semiconductor device as defined in claim 20 80,

wherein the second insulating layer is formed to avoid a region in which at least one of the posts is formed, and

25 wherein the third conductive layer is formed to pass over at least one of the posts.

82. The method of manufacturing a semiconductor device as defined in claim 81,

wherein at least one of the posts is formed by a plurality of steps.

83. The method of manufacturing a semiconductor device as defined in claim 80,
further comprising:

5 forming one or more electronic components,

wherein each of a plurality of components forming one of the electronic
components is formed by discharging drops of a solvent containing fine particles of a
material.

10 84. The method of manufacturing a semiconductor device as defined in claim 83,
wherein each of the electronic components is one of a capacitor, a resistor, a diode, and
a transistor.

15 85. The method of manufacturing a semiconductor device as defined in claim 83,
wherein at least one of the electronic components is formed on a surface on which the
first conductive layer is formed.

20 86. The method of manufacturing a semiconductor device as defined in claim 83,
wherein at least one of the electronic components is formed on the insulating layer.

25 87. The method of manufacturing a semiconductor device as defined in claim 83,
wherein at least one of the electronic components is formed on the second insulating
layer.

88. An interconnect substrate manufactured by the method as defined in claim 1.

89. A semiconductor device manufactured by the method as defined in claim 24.

90. A semiconductor device manufactured by the method as defined in claim 31.

91. A semiconductor device manufactured by the method as defined in claim 51.

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92. A semiconductor device manufactured by the method as defined in claim 70.

93. A semiconductor device comprising:

a substrate including a depression section;

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a first conductive layer formed to pass through the depression section;

an insulating layer, at least a part of the insulating layer being disposed on the first conductive layer;

a second conductive layer, at least a part of the second conductive layer being disposed on the insulating layer over the first conductive layer; and

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a semiconductor chip mounted in the depression section.

94. The semiconductor device as defined in claim 93,

wherein the semiconductor chip is electrically connected with the first conductive layer.

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95. The semiconductor device as defined in claim 93,

wherein the semiconductor chip is electrically connected with a conductive layer other than the first and second conductive layers.

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96. A semiconductor device comprising:

a substrate including a depression section;

a semiconductor chip mounted in the depression section of the substrate with a

surface of the semiconductor chip on which an electrode is formed facing upward;

a first conductive layer formed over the substrate and the semiconductor chip so that the first conductive layer is electrically connected with the electrode of the semiconductor chip;

5 an insulating layer, at least a part of the insulating layer being disposed on the first conductive layer; and

a second conductive layer, at least a part of the second conductive layer being disposed on the insulating layer over the first conductive layer.

10 97. The semiconductor device as defined in claim 96, further comprising:

a resin layer formed in the depression section in which the semiconductor chip is mounted,

wherein the first conductive layer is formed to pass over the resin layer.

15 98. A semiconductor device comprising:

a first substrate;

a semiconductor chip mounted over the first substrate with a surface of the semiconductor chip on which an electrode is formed facing upward;

20 a second substrate having a shape which avoids the semiconductor chip and being attached to the first substrate;

a first conductive layer which is formed over the second substrate and the semiconductor chip so that the first conductive layer is electrically connected with the electrode of the semiconductor chip;

25 an insulating layer, at least a part of the insulating layer being disposed on the first conductive layer; and

a second conductive layer, at least a part of the second conductive layer being disposed on the insulating layer over the first conductive layer.

99. The semiconductor device as defined in claim 98,
wherein the second substrate has a coefficient of thermal expansion closer to a
coefficient of thermal expansion of the semiconductor chip than a coefficient of thermal
5 expansion of the first substrate.

100. A circuit board on which the semiconductor device as defined in claim 89
is mounted.

101. A circuit board on which the semiconductor device as defined in claim 90
is mounted.

102. A circuit board on which the semiconductor device as defined in claim 91
is mounted.

15 103. A circuit board on which the semiconductor device as defined in claim 92
is mounted.

104. A circuit board on which the semiconductor device as defined in claim 93
20 is mounted.

105. A circuit board on which the semiconductor device as defined in claim 96
is mounted.

25 106. A circuit board on which the semiconductor device as defined in claim 98
is mounted.

107. Electronic equipment comprising the semiconductor device as defined in
claim 89.

108. Electronic equipment comprising the semiconductor device as defined in
5 claim 90.

109. Electronic equipment comprising the semiconductor device as defined in
claim 91.

110. Electronic equipment comprising the semiconductor device as defined in
10 claim 92.

111. Electronic equipment comprising the semiconductor device as defined in
claim 93.

112. Electronic equipment comprising the semiconductor device as defined in
15 claim 96.

113. Electronic equipment comprising the semiconductor device as defined in
20 claim 98.